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Ethnographies of Higher Education and Modes of Existence: using Latour's philosophical anthropology to construct faithful accounts of higher education practice.

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Abstract

Bruno Latour, one of the architects of actor-network theory, has now enfolded this approach within a larger project, *An Inquiry into Modes of Existence – AIME*. Framed as an empirical inquiry into the ontological and epistemological conditions of modernity, Latour argues for a radical shift in how 'objective truth', 'scientific fact' and 'meaning' are established within the world. In this chapter I draw on several elements of AIME to illustrate how Latour's ontology, building on, augmenting and responding to criticisms of actor-network theory, can be used to explore higher education, focussing on one episode derived from a larger ethnography of medical education.

Introduction: reflections on places where people learn

In May 2018, I was walking through different wards and rooms in a training hospital in Nova Scotia, Canada, with the other members of the research team of which I am a member. Our current project, *Becoming a Professional Through Distributed Learning: a Sociomaterial Ethnography*, is exploring distributed medical education (DME) in Canada. As we walked through the spaces where the students practice their clinical skills with medical simulation dummies or manikins, we discussed the relationship between these practices, and the real-life experiences that they would encounter when taking up their clerkships in geriatric or emergency medicine, discussions that we returned to as we watched video recordings of the students as they fitted Foley catheters to the manikins (a catheter is a flexible tube used to drain urine from the bladder, named after Frederic Foley who originally designed them). Many of our conversations focussed on the proliferation of material artefacts that the medical students were using: artefacts that had to be learned about so that they could be correctly and safely employed, but also artefacts that in themselves carried aspects of the medical curriculum, reified in particular forms. The students had to practice fitting Foley catheters correctly as a technical or mechanical skill, but also needed to know about Foley catheters: what they are and what they do, how they have come to be in the forms that they are, how they are adapted to – and therefore how the students would have to learn through their practice to adapt to – different physiologies. Our previous research into the same curriculum provision had focussed on the ways in which the curriculum is delivered across two sites, geographically distant from one another, but linked through a rich network of technologies, staff, students, and processes (MacLeod et al., 2015, 2016, 2018; Tummons et al., 2015, 2016, 2018). We focussed on lecture rooms and seminar rooms, on the technologies of the classroom that brought the two campuses together, and on the people who worked with and around these technologies, whilst our current project is concerned with clinical, professional practice. Consequently, our field of inquiry has been relocated, away from 'typical' university teaching accommodation, and towards those teaching spaces that provide 'authentic' constructions or representations of the clinical contexts that the students will become part of firstly during their clerkships, and later after qualification.

Looking through some of the photographs that were used to construct one of our data sets, it seems uncontroversial to suggest that these two research projects are situated within quite different spaces/places. Notwithstanding the fact that the large lecture hall at the main university campus was designed and engineered specifically for the distributed medical education (DME) curriculum, it looks and feels like a lecture hall that might easily host a group of history or sociology students. Once we start to explore the particular technological affordances of the lecture hall – the microphones, the push-button question-and-answer system, the cameras, the dedicated audio-visual personnel – the hall can be seen for what it is: a technologically-mediated pedagogical space designed for and around a specific model of distributed curriculum delivery. And it is not difficult to imagine this infrastructure being employed to deliver a quite different subject area curriculum. But there is no mistaking the specific pedagogical intent that provides the foundations for the clinical practice teaching spaces. The shelves of equipment, the beds, the medical manikins (of which there are different kinds), the stethoscopes and IV stands (the metal uprights used to hold an intravenous drip), reify not only different elements of the pedagogical practices that are being acquired, but also different aspects of the clinical, professional practice that the students are working towards entering. Our historians and sociologists (unless they are perhaps researching the history of medicine or the sociology of healthcare organisations) would certainly feel out of place in such an environment. How, as ethnographers, are we to make sense of the relationships between these two archetypal spaces, the lecture hall and the training ward, if we wish to construct a meaningful account of these places? To what extent does doing well in the lecture hall transfer to the training ward and in turn to clinical practice? In what way, if at all, does reflecting on workplace learning in the training ward facilitate the construction of professional knowledge? To what extent does simulation-based learning help facilitate authentic clinical practice? Problematic issues such as these concerning the transfer of practice, learning or knowledge across different sites are not novel. Nor are they restricted to the provision of medical education within universities. However, my argument is that the focus on how such distinct sites might be bridged – by the movement of people, the transfer of cognition, the sharing of artefacts and practices – rests on a *category mistake* (Ryle, 1949) that prevents us from establishing apodictic accounts concerning those *matters of concern* (Latour, 2005) – here, the practices of a medical education curriculum – that we have chosen to unpack. The theoretical and empirical framework that I propose to employ in order to progress this inquiry is derived from the recent work of Bruno Latour, and it is to an explication of this framework that I shall now turn.

Bruno Latour: from actors and networks to modes of existence

Actor-network theory remains an under-used sociological/philosophical approach within educational research compared to Bourdieusian or Foucauldian studies. It has been employed to explore a number of diverse aspects of educational provision, including university physics and business curricula (Nespor, 1994), PISA testing (Gorur, 2011), higher education policy and the Bologna Process (Sarauw, 2016), teaching in nurseries (Plum, 2018), professional standards for teachers (Mulcahy, 2011), the relationship of technology to theory in education research (Thumlert et al., 2015) and the construction of knowledge through ethnographic research in education (Larsson, 2006). It has been described as: a component of ethnography that is concerned with “the processes of ordering that generate effects such as technologies” (Law, 1994: 18); a “way of talking... [that] allows us to look at identity and practice as functions of ongoing interactions with distant elements (animate and inanimate) of networks that have been mobilized along intersecting

trajectories” (Nespor, 1994: 12-13); and a “sociology of the social and ... [a] sociology of associations” (Latour, 2005: 9). It is a way of exploring how social projects are accomplished in ways that can be traced across networks of all sorts of stuff: stories, people, paperwork, computer simulations, routines, texts and voices. It provides ways of thinking about how networks or associations carry influence and influence each other, and foregrounds the ways in which people as well as things are made to do things across boundaries of geography or time or institutions. Gorur (2011) positions her research within an ‘early’ or ‘classic’ actor-network model or approach as epitomised by Latour and Woolgar (1979): for her, the PISA assessment is her laboratory, and the ways by which the results of the PISA assessments are translated into objective policy statements are her scientific facts (2011: 78). Later approaches tend to be identified as ‘after’ actor-network theory, and other terms that are used to denote an actor-network informed approach include material semiotics and method assemblage – a plurality of approaches that reflects a postmodernist standpoint. At the same time, it might be suggested that some of the people who use actor-network theory actively resist defining it in any specific way, referring instead to the possibility of a multiplicity of versions and a concomitant undesirability to define just one (Fenwick and Edwards, 2010). It remains for some a collection of more-or-less disparate approaches, an assemblage of methods of exploration and of frameworks for analysis that need to be understood in terms of empirical, and not abstract, inquiry (Law, 2008).

Actor-network theory is now absorbed within a larger anthropological and philosophical project, *An Inquiry into Modes of Existence* (AIME) (Latour, 2013). AIME constitutes an assemblage of several strands of Latour’s work, including science and technology studies (STS), explorations of modernism, geopolitics, semiotics, and philosophy (Delchambre and Marquis, 2013). AIME sets out to construct a systematic description of the different ontological systems that co-exist to describe contemporary ways of being (Ricci et al., 2015). Elements of AIME have begun to be employed through explorations of legal theory (McGee, 2014), politics and postpolitics (Tsouvalis, 2016), contemporary academic practice (Decuyper and Simons, 2016), and higher education (Tummons, 2019). Modes of existence are those social, technical, semiotic and material conglomerations such as *politics*, or *technology* or *morality*, that constitute the empirical multi-realist ontology that Latour has concerned himself with. For the empirical researcher – and Latour continues to commit himself to empirical as well as philosophical and metaphysical work (Berliner et al., 2013) – the modes constitute a “box of intricate, ontological tools” (Hämäläinen and Lehtonen, 2016: 28). Latour has identified fifteen such modes of existence, labelled through the use of a series of notations: thus, politics becomes [POL], technology becomes [TEC] and morality becomes [MOR], and I shall return later on to those modes that are relevant to the present inquiry. Subsumed within AIME, actor-network theory is now designated as [NET] (in the original French, [RES], from *acteur-réseau*), just one amongst fifteen, although pivotal to AIME as the starting point for any investigation (Conway, 2016; Latour, 2013). Latour does not explicitly address the notion that there might be more (Edward, 2016), but Decuyper and Simons (2016) have proposed academic practice as a mode of existence. Here, I draw on AIME to illustrate how Latour’s multi-realist ontology can be used to explore the stuff of education more generally, and the problematics of transferring cognition and practice across boundaries more specifically.

Modes, crossings, and category mistakes: moving towards knowing things

According to AIME, one of the ways through which we can advance our inquiries about the world we live in and the things we do, is through the identification, explication and avoidance of *category mistakes* (Ryle, 1949). Category mistakes are ontological mistakes. When something that consists of one property is presented as consisting of a different property, then a category mistake in relation to the thing has occurred. It is by disambiguating the ways in which we make sense of the phenomenon being discussed, that the category mistake can be resolved. Ryle (1949: 6-7) provides different examples of category mistakes, one being that of someone watching a game of cricket for the first time who, after having paid attention to explanations of the different roles of the fielder, the bowler and the wicket-keeper, complains that the explanation has not encompassed the role of maintaining 'team spirit' or 'the spirit of the game'. Any subsequent correction of this category mistake would need to explore the difference between the different roles that the players have on the field, and their wider, more collective role, in playing the game in a positive, mutually-encouraging manner.

Latour takes up Gilbert Ryle's notion of the category mistake as a key feature of AIME. Significant numbers of category mistakes bear on the different modes of existence, but thanks to a systematic empirical inquiry, we can resolve these and, by doing so, begin to construct our truthful accounts of the world (Latour, 2013: 17-18). They occur when we mistake actual things in the world with the ways in which we write or talk about them, or make images of or about them, or even sing about them should we choose to do so. For example (for what follows, See Latour, 2013: 69 ff.): south of Grenoble in France is Mont Aiguille. If we want to know more things about this place, should we go hiking there, or study some maps, or both, or do something else entirely? In fact, we can do a number of different things to intensify our efforts in knowing about Mont Aiguille: go on more extensive walks; write more, richer descriptions of the routes and the rocks; and undertake more frequent geographical surveys with increasingly sophisticated measurement tools. In this way the steady accumulation of maps, photographs, memoirs, diagrams, signs, and so forth that allow us to 'see' and to 'know' about Mont Aiguille – without even needing to actually go there if we can't manage it – becomes stronger and richer. Throughout, the ontological bifurcation between the map and the mountain needs to be remembered. To forget this would lead to a category mistake: a conflation of the mountain, with what we know about the mountain. Or, to put it another way through introducing two of the modes of existence, we might instead say that when we confuse or conflate real things or beings, which are referred to within AIME as *beings of reproduction* [REP], for the ways in which we write and talk about them, which are referred to within AIME as building up into chains of information and understanding or *reference* [REF] that we have established in order to bring those same beings into view, a category mistake of the [REP-REF] type is introduced. [REP-REF] is an example of a *crossing*, the first of several that I shall draw on, between two modes (Latour, 2013).

Actor-network theory has been criticised in several ways: for lacking an explanatory framework for causality; for constructing 'flat' ontologies; for glossing over manifestations of power; for privileging only certain ways of viewing the world; for offering a problematic view of non-human agency; even for being unethical (Kipnis, 2015; Law and Singleton, 2013; Sayes, 2017; Waelbers and Dorstewitz, 2014). It is beyond the scope of this chapter to address these arguments directly: however, once enfolded within AIME, actor-network theory as [NET] becomes only the starting point for our inquiry. It gets cut down to size, reduced from being used/misused as an overarching explanatory framework which, mindful of its post structural ancestry, it was

never intended to be. [NET] becomes the starting point, a way to trace the heterogeneous elements of those courses of action that we are seeking to trace. The medical education curriculum that is delivered in the lecture hall and the training ward (but of course not only in these two places) and that enrolls staff, laptop computers, students, furniture, cameras and so forth, is a [NET], an actor-network (Tummons et al., 2018), as are the undergraduate physics and business curricula explored by Nespor (1994). The body of policy documents derived from the Bologna Process that are created, distributed, and then read at a university in Denmark constitute a [NET] (Sarauw, 2016), as does a set of professional standards for teachers and the teachers and accreditation offices who read them (Mulcahy, 2011). But our inquiry needs to go further. [NET] allows us to establish “maximum associational connectivity” (Conway, 2016: 7), but no more. Yes, these networks are all assemblies of heterogeneous elements, human and non-human. Within a [NET], any element can associate with any other, and no border limits the extent to which they can do this. But what we want to also be able to do, is to determine the distinctive ways by which they associate: a set of professional standards is a [NET], and a curriculum is a [NET] – but they are, self-evidently, not the ‘same’. We need to do more with and for the different [NET]s that we describe and unravel, and we can use the other modes of existence to do so. Consider the two university curricula explored by Nespor (1994). Having adopted an actor-network perspective, it is relatively straightforward to describe both curricula in these terms. Nespor researches and writes as an ethnographer, and actor-network theory is often described as an aspect of ethnography as well as of sociology: indeed, ANT has been described as requiring an “insistence on painstaking ethnographic research” (Kipnis, 2015: 43). The physics and business departments/curricula are both made up of people, routines, rooms, students, curriculum documents, and so forth (Nespor, 1994). They are both made up of networks of human and non-human actors, all accomplishing the delivery of the curriculum in question. But they are no more ‘the same’ than a professional standards [NET] is the same as a curriculum [NET]. Our concern, therefore, is to make sure that we do not mistake one kind of [NET] for another – to do so would be a category mistake and would threaten the ontological pluralism on which the AIME project rests.

To prevent such a “mistake of direction” (Latour, 2013: 50), we need to find a way to undertake conversations about one [NET] in contrast to another, before we enroll any other modes of existence in order to further our inquiry. Latour (2013: 58), once again drawing on analogy, gives the example of three texts: a novel, a testimony, and a thesis: it would be a category mistake to read a thesis, believing throughout that it was in fact a novel. Drawing on Alfred North Whitehead (alongside Ryle, another key influence on AIME), Latour argues that for any situation to be explained, we need to consider how to understand the explanatory account that is to come: to sustain the analogy – is a text that we have in front of us a novel or is it a thesis? Each has its own distinctive ways of working, of establishing truthfulness, of how it is to be interpreted. Within AIME, this is described as the pre-position: [PRE]. Whatever it is that we are interested in exploring – a text, a curriculum, a university department – can therefore be understood firstly in [NET] mode, through which we can trace the network of associations and connections of human and non-human actors as far as necessary (implying some kind of boundary process – a matter to which I shall return later), and secondly in [PRE] mode, through which we can *qualify* the *types* of associations and connections that allow the [NET] to extend. Thus, in order to prevent a category mistake, our ethnographer can use the [NET-PRE] crossing to create our rational accounts. For Nespor’s (1994) physics and business curricula, from the perspective of

AIME, it is only, and necessarily, through [PRE] that the networks [NET] that he describes can be variegated, rendered “in full colour” (Conway, 2016: 49), instead of black-and-white.

We are nearly at a stage where we can return to the medical students, to their lecture hall and their training ward. But before doing so, one further mode of existence needs to be introduced, in order to provide us with ways to think about the material, non-human artefacts, objects, and *immutable mobiles* (Latour, 2005), that are found strewn throughout the medical curriculum. To some extent, all of this stuff has already been enrolled in our account. The chains of information or understanding or *reference* [REF] that allow us to move towards objective knowledge, to make sense of, in this instance, places or beings that we might not have actually seen in real life [REP] – maps (whether of Mont Aiguille or somewhere else) provide a good example and have long been part of Latour’s ontology – are constructed of layer upon layer of immutable mobiles. The more stuff we have, the stronger and more robust these chains of reference become. But just as we need more than [NET] in order to make sense of the associations that we are tracing, so we need more than ‘just’ immutable mobiles to make sense of both the non-human actors and the human actors that inscribe, manipulate, employ or discard them, that are all enrolled within this medical curriculum.

Consider once more the chains of information and knowing, or reference [REF] that have over time been assiduously established to allow the armchair tourist and keen Rambler equally to learn about Mont Aiguille. These have been established, made thicker and richer, over many decades as walkers, geologists, surveyors and cartographers have made drawings, traced maps, and taken photographs. These drawings, maps and other documents are all examples of the kind of non-human artefacts that are paradigmatic within actor-network theory (ANT), and neatly demonstrate the *principle of symmetry*, which assumes that within ANT “humans are not treated differently from non-humans...Humans are not assumed to have a privileged a priori status in the world but to be part of it” (Fenwick and Edwards 2010, 3). But we need to consider this in more careful detail (thereby addressing those criticisms of ANT that question the extent to which it is capable of satisfactorily explicating the entanglements of people and things (Hodder, 2014)). Specifically, we need to think about the ways in which the artists, map-makers, surveyors and photographers have gone about their work in making these objects, processes that necessarily also involve the use of other objects (pens and pencils, paper, measuring tapes, cameras, lenses), and which in turn have been made and refined over time by other people. We do not need to trace the history of the theodolite (an optical instrument used by surveyors to measure angles) from an early prototype to a contemporary state-of-the-art example in order to sensitize ourselves to the notion that it is in how people use theodolites, how people go through the slow process of learning how to use one from the first moment that they see one on the first day of their land surveying course at university, to their latest work in the field, to appreciate that *something technological* is taking place even though, when we watch our experienced surveyor, all of that learning, those early mistakes and fumbles, have been lost sight of, and have become invisible, hidden behind habitual skill accrued through long practice. It is not solely in the object – the theodolite, or indeed whatever other objects might be of interest to us as ethnographers – that the mode of technological existence, designated [TEC], is to be found, but in the movements that take place around it: the gestures, the posture, the fine movement of the theodolite’s eye piece or tripod stand that are now so fluid as to be almost invisible (Latour, 2013: 221). We can maintain the principle of symmetry between human and non-human, but we can explore behind and around it at the same time. A network [NET] remains a socio-technological phenomenon, irrespective of the

sophistication of the technology involved, but through the [TEC-NET] crossing our ethnographer can distinguish the technological from the 'merely' non-human.

One troublesome aspect of technology, however, is that it seeks to be forgotten, to become invisible, causing the ethnographer to lose sight of the processes, steps, improvisations and routines – the *operational sequences* – through which objects are put into use (Latour, 2013: 221-3). It is all too easy to forget how objects get made to do things or to perform operations: simply remembering that objects need people (the ANT-ish solution) is not really sufficient. The danger is that we assume that once the technological object has been constructed and put into place and once the users have had sufficient practice, we lose sight of all of the operational sequences that underpin it: the mistake would be in assuming that objects hold up by themselves once they have been deployed. Latour uses the analogy of accessing information on a computer to illustrate this problem, contrasting the need to account carefully for how things get done – in this case, how technological objects get deployed and used – with the immediate delivery of information that we might receive, sat in front of our laptop computers, from double-clicking on a mouse button. Thus, the *double click* mode [DC] constitutes the antithesis to the inquiry presented within AIME, namely that there are no such things as facts that speak for themselves (Latour, 2013: 137), and if we focus on technology and the technological without also considering operational sequences, we risk a category mistake of the [TEC-DC] type, by which we might lose sight of the correspondence between form and function in our exploration of what technologies are doing and how they are made to do it, failing to appreciate what lies underneath and behind the skilled dexterity of the accomplished user precisely because the faltering steps of the novice have been lost sight of – both examples of the operational sequences that our ethnographer will wish as well as need to follow if she is to construct a more faithful [TEC-REF] account of the work that the technologies do.

In establishing our accounts of the medical education curriculum in terms of [NET-PRE], therefore, the [NET] mode serves to remind us, as ethnographers, that the medical education curriculum consists of a heterogeneous series of associations of human and non-human elements which in terms of [PRE] can be understood as being 'in medical education' about them, a quality that is revealed through the inquiry thanks to the accounts of the research participants, the people who are enrolled within the [NET] – educators, medical professionals, students, simulated patients, technicians, and so forth. At the same time, the [NET] also consists of non-human elements, about which, thanks to [TEC], we can say more than simply (although it is by no means simple) that they are as important for our analysis as are the human actors within the network (echoing the principle of symmetry).

'Real life' medical education

We are now in a position to return to the problems concerning the transfer of learning and practice that I put forward at the beginning of this chapter. Consider the use of simulated patients in medical education, a common element of medical education curricula. It is habitual for such programmes to require students to conduct medical examinations, to write up a patient history perhaps, for 'patients' who are played by actors with a script. Through the assessment process that surrounds such patient simulation – writing reflective essays, checklist-mediated observations – a simulation of a 'real world' medical environment is constructed and assessed (Young et al., 2016). In this way, it is argued, it is possible to encourage students-becoming-

junior-doctors' facilitation of the transfer of skills and knowledge to clinical practice (Maggio et al., 2015; Taylor et al., 2015). Indeed, even if we acknowledge the gap between the learning context and places of clinical practice, the provision of authentic training environments, and/or of particular pedagogical strategies such as problem-based learning (PBL) are positioned as a way to bridge such a gap (Collard et al., 2016; Mausz and Tavares, 2017). 'Traditional' models of curriculum that require a lengthy period of classroom-based study before moving into clinical environments have been replaced by more blended curricula where 'authentic' clinical experiences are afforded to students in their first year of study (Yardley et al., 2013), encouraging more learning in workplaces, rather than workshops (Steinert et al., 2016).

Through initiatives such as these, we can identify a discourse of learning that foregrounds the contextual and the situated, stressing the need for pedagogies that are 'authentic', based on 'real practice' and rooted in 'real life'. The difficulty, for our ethnographer, is that the bifurcations that are sustained between 'the academic' and 'the clinical', 'the theoretical' and 'the practical,' or 'the simulated' and 'the real' all serve, no matter how sophisticated our attempts to bridge them, to establish distinct *domains* of particular kinds of practice. I am not setting out to critique the theoretical models of learning and practice that underpin studies such as these: in fact, it is a perspective that I share (Tummons, 2018). But the different domains within which practice, and therefore learning (maintaining the social practice model) are situated, and which are necessary corollaries of a situated approach to learning (Illeris, 2007), are more troublesome. Latour provides an example (Latour, 2013: 30): placing his nominal ethnographer within a laboratory, she notes that the artefacts, routines, and papers around her all indicate that she is 'in science' – but as she continues her inquiry, she records visits from a patents lawyer, a member of the clergy discussing ethics, a microscope repair technician, an industrial end-user of one of the laboratory's products, and so forth. Upon speaking to her informants, she learns that these visitors are all as important to the success of the laboratory as are the microbe cultures, lab coats and so forth: they are all 'in science'. So where will her inquiry take her next: to the law offices to explore the work done by patents, or to the factory where the end product is used in manufacturing? The answer, of course, is that in a way it does not matter, except insofar as Latour's ethnographer might have specific research questions to answer or only a fixed amount of time within which to present her thesis, or insufficient funds to justify a trip to the factory *and* a trip to the patent office. The heterogeneous practices, elements, habits, or actions that she might choose to follow are not bounded by any inherent essence that marks them out as being within different domains, from the point of view of the network that she is interested in tracing, the people, things and practices that she is interested in following as they move around the network. Similarly, the students who are practicing fitting Foley catheters to manikins are 'in medical education'. The paraphernalia and culture of medicine surround them, but they are not 'in medicine', not yet. The manikins, the instructors, the fact that the Foley catheters are not freshly unwrapped each time but are re-used by the students as they practice, all combine to indicate to us, as ethnographers, something that is self-evident to them – that they are 'in medical education', and this is the pre-condition [PRE] of the network [NET] that as researchers we are interested in.

The Foley catheters are just one example of the technologies that proliferate within this network [TEC-NET]. The manikins are another, deserving of their own inquiry in fact, and it is in the painstaking, error-strewn, hesitant practice of the students as much as the fluent skill of the instructor, that the ways in which these two technologies work with each other and *fold* around each other (Latour, 2013: 228), can be seen: here is

where we find the mode of technological essence [TEC]. More specifically, Latour argues that through considering the trajectory from the former to the latter, from the stumbling apprentice to the skillful artisan (conveniently echoing elements of a social practice accounts of learning, although it would certainly be a category mistake to elide a community of practice with an actor-network), we can see the operational sequences that allow them to be activated. And it is important to keep these sequences in view if we are to understand properly how the capacities of the [TEC] can be brought into being. The trick is to avoid taking [TEC] for granted, for anything of the technological always needs to be looked after: [TEC] can never be left alone. This is why the stumbling apprentice is particularly useful to Latour's ethnographer: as she watches the beginner painstakingly complete a sequence of operations that an experienced, skilled practitioner would complete in a matter of moments, she can quite literally see laid out before her all of those processes or steps that the [TEC] requires. The *élan* with which the experienced user completes the tasks at hand still rest on the same sequences, the same technical folding, but they are lost sight of. The danger is in making the category mistake of assuming that the [TEC] is now fully mastered, working smoothly, with no risks or hang-ups, no chance of a displacement or a breakdown. Latour uses the analogy of accessing information on a computer to illustrate this problem, contrasting the need to account carefully for the things that we are interested in (which need not be restricted to Foley catheters, of course), as ethnographers, with the immediate delivery of an answer that we might receive, sat in front of our laptop computers, from double-clicking on a mouse button. Thus, the *double click* mode [DC] constitutes the antithesis to the inquiry presented within AIME, namely that there are no such things as facts that speak for themselves (Latour, 2013: 137). [DC] attempts to "short-circuit" the other modes "by reducing them to the instantaneous, transcendent transfer of information" (Conway, 2016: 7). Here, our category mistake would be in assuming that once the technological operating sequence has become fluent, swift, even insouciant, the technology can be left alone, trusted to function, or be overlooked or even forgotten about – a category mistake of the [TEC-DC] mode (Latour, 2013: 227).

Foley catheters: from situated practices to heterogeneous courses of action within a network

The lecture hall and the training ward (I am using this dualism to exemplify a broader argument relating to any of the other technologically-mediated spaces that the medical education students might use) do not constitute different domains that require innovate modes of 'authentic' or 'real-life' assessment to facilitate a bridge between them, because there are no such things as domains, at least in the way that the discourses of authentic context-bound learning define them. To try to bifurcate the two sites in this way makes little sense because there is no real boundary between them. In fact, the opposite is self-evidently true (AIME is not a post-modernist project – establishing apodictic statements about the world is a paradigmatic element of the inquiry), not least as there is so much traffic between them. They are part of the same [NET] – and we can distinguish this [NET] from all of the other networks that might entangle the lecture hall and the training ward through the use of [PRE]: our interest is a network that is 'in medical education'. From this [NET-PRE] starting point, any attempt to distinguish between the lecture hall and the training ward is a category mistake, as is any attempt to suggest that practicing fitting Foley catheters with manikins is 'real life' or 'authentic'. I am not arguing that such practice is *not* 'real-life' or *inauthentic*, as this would assume a dualism (authentic/inauthentic) that might be attached to Foley catheter practice if the correct conditions were to be found or established. Rather, it is the case that the use of descriptors such as 'real-life' or 'authentic' when

talking about the use of, and by extension the assessment of, Foley catheters in a medical education [NET] constitutes an attempt to attach more-or-less permanently, through the use of the assessment process, a particular quality of permanence to the use of the Foley catheters. This discourse of authentic assessment purports to generate a warrant for the application of a Foley catheter that claims generalisability and completion – a warrant that states that the person who holds that warrant (that is, the new medical professional who has now finished her education) can now fit Foley catheters in all kinds of places and at all kinds of times. And it is here that our ethnographer can identify the category mistake of the [TEC-DC] mode: the sometimes error-strewn, slow and unconfident operating sequence of the beginner has been forgotten, displaced by the confident fluidity of the expert, a confident fluidity that is warranted by a successful assessment process. The intended effect of this process is to be able to generate an unproblematic statement relating to the use of the Foley catheter, namely that for the individual who has been awarded the warrant – who has passed the assessment – the Foley catheter has now been ‘mastered’, and that the provision of a ‘real-life’ assessment has served to generate a quality of transferability of usage that transcends context (somewhat ironically, contradicting the situated learning models that such an assessment model purports to rest on). In this way, the [TEC-DC] category error is made: the Foley catheter as [TEC] succeeds in becoming forgotten, and the operating sequence that underpins the use of the catheter is reduced to an operation of the [DC] mode. The skill and capacity of the human user is rendered unproblematic, and the agency of the catheter (following the principle of symmetry) as an artefact is ignored. But from the point of view of AIME, the Foley catheter as [TEC] stays being used in the same way irrespective of where or when, or even by whom, it is being used. Beings of the [TEC] mode behave the same way whether we encounter them in a training ward, in clinical practice, in a lecture hall, or in a seminar room. Through *reversing our viewpoint* (Latour, 2013: 230) of the catheter, we can instead foreground what it does and how it does so, with whom, and for how long. Instead of simplifying what Foley catheters do, therefore, AIME instead pushes us, as ethnographers, to follow the Foley catheter as [TEC] across any of the actor-networks [NET] across which it may become entangled [TEC-NET]. How they are used and what they do need to be made sense of not in terms of the changing competences or trajectories of the people who use them (from trainee to practitioner, from novice to expert, from in an ‘authentic’ context built within a university teaching hospital to a community hospital), but in terms of the different networks [NET] that they are enrolled within. The distinctions are to be found not in the novice/expert bifurcation but in the nature or quality – [PRE] – of the ontologically different networks that are being followed. Through an ethnographic account of the Foley catheters we can begin to establish objectified knowledge of what they do and how they work [TEC-REF] as a counter to the [TEC-DC] category mistake.

Conclusions [i]: expanding the inquiry

AIME is an empirical inquiry, looking at different courses of action within different domains, interrelated but nonetheless distinct. Through this inquiry we can generate robust, pluralistic accounts of the world. These accounts are rooted in the empirical, and it is through ethnographic research that the present account has been realised, through which AIME can proceed. An inquiry into any course of action starts with the identification of the things, processes and people who are involved in allowing this course of action to come to pass, enrolled within an actor-network or [NET]. The explication of a [NET] can start at any point within the network – such as the moments at which medical students start to practice using Foley catheters [TEC] –

and from that starting point the ethnographer can travel in any number of directions, so long as she continues to trace the connections, leaps, and movements that the things and people enrolled within the [NET] pass through (Latour, 2005). From here, the ethnographer can look for those category mistakes that are lost sight of by our informants (who, in line with the *principle of symmetry* which is characteristic of actor-network theory, can be both non-humans as well as humans). Such mistakes lead to knowledge of the [DC] type, such as the way in which the operating sequences that tell us how technology works are lost sight of and reduced to [TEC-DC] knowledge. How, then, ought we proceed with the present inquiry, that has begun to unravel the ways in which just one medical education curriculum might be talked about and understood? Maintaining a commitment to empirical investigation, the answer, quite simply, is to continue to follow the actors, to trace the networks, to look for category mistakes that provide a way in to the ways in which our informants speak of themselves before proposing different formulations of the link between practice and theory. This is what lies at the heart of AIME: to unpack the dichotomies – or category mistakes – that are characteristic of ‘Modernity’: practice/theory; subject/object; or mind/body (Delchambre and Marquis, 2013). The argument that I have outlined here refers to just one example of [TEC]. What if we were to focus instead on the simulation manikins that the students practice using the Foley catheters with?

Conclusions [ii]: education as a mode of existence

Mindful of the pre-condition [PRE] of the network [NET] that I have discussed above, it seems right to foreground that it is the educational function, philosophy and purpose of the medical education curriculum that establishes the *interpretive key* (Latour, 2013: 48) for the account presented. It is the ‘in education’ quality of the ‘in medical education’ network that shapes how the Foley catheter [TEC] is being used, how the ways in which it is talked about are established [REF], how different people use and watch them being used, what other technologies [TEC] are used with and alongside them, all combining to render how they are used, in this [NET], as being different from how they are used in a different [TEC-NET] such as an emergency medicine ward.

Latour defines a mode of existence in terms of four aspects (Latour, 2013: 488-489). Firstly, we need to consider the *course[s] of action* being followed – the *trajectory* of the social phenomenon that we are concerned with – and look for the *hiatuses* that the course of action has to overcome. Secondly, we need to consider how this mode establishes ‘true’ and ‘false’ statements – the *felicity and infelicity conditions* that pertain to it. Thirdly, we need to explore the *beings* that the mode institutes. Finally, we consider the otherness or *alterity* of the mode: here, those aspects of the mode that generate an ontology distinct from any other mode. The first of these might be described in terms of the establishment of educational programmes, of assessments, of codified bodies of practice and knowledge: people take up apprenticeships and enroll on postgraduate diplomas, buy particular books and are awarded certificates. Establishing all of this requires political initiative, the coordination of large numbers of people as well as resources, financial planning, examination procedures, and so forth. The second might be understood in terms of what is ‘educational’ and what is not – a distinct process from describing something as being about ‘learning’, which might happen in all kinds of other contexts beyond those which we can agree are ‘educational’ even if we do not subscribe to their underpinning philosophy or justification in terms of utility or outcome. The third can be explained in terms of people – teachers, students, technicians – but also in terms of technologies, books,

portfolios, checklists: the people and stuff of education work that we might find out of context but the function or pre-condition of which we would not mistake. And the fourth is evident in the ways in which education is distinguished by buildings, by policy discourses, by visible signifiers of participation such as uniforms or identity badges, all of which help distinguish educational structures and institutions from, for example, legal ones. From these starting points, mindful not only of the pragmatism that underscores Latour's work (Hämäläinen and Lehtonen, 2016), but also of the rich empirical work that AIME rests on, it seems appropriate to augment some earlier conclusions (Tummons, 2019) and to describe *education* as being a distinct, recognizable phenomenon of the world, signified by people, objects, buildings, ways of being, of talking, and of argumentation, processes, and policies. It is a subject for conversation, for political exhortation, for lampooning in fiction, and for media coverage. It is, simply put (although a full explication will be far from simple), a mode of existence, which I shall annotate as [EDU].

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